

### Abstract

5 A system and method for performing modeling, prediction, optimization, and  
control, including an enterprise wide framework for constructing modeling, optimization,  
and control solutions. The framework includes a plurality of base classes that may be  
used to create primitive software objects. These objects may then be combined to create  
optimization and/or control solutions. The distributed event-driven component  
10 architecture allows much greater flexibility and power in creating, deploying, and  
modifying modeling, optimization and control solutions. The system also includes  
various techniques for performing improved modeling, optimization, and control, as well  
as improved scheduling and control. For example, the system may include a combination  
of batch and continuous processing frameworks, and a unified hybrid modeling  
15 framework which allows encapsulation and composition of different model types, such as  
first principles models and empirical models. The system further includes an integrated  
process scheduling solution referred to as process coordinator that seamlessly  
incorporates the capabilities of advanced control and execution into a real time event  
triggered optimal scheduling solution.